9000 COUNTDOWN PROCEDURES Mk. 70 Terrier-Improved Orion 12.053 GT/Krause

9100 NASA Roles and Responsibilities

The following definitions describes the roles and responsibilities of key NASA personnel:

Test Director (TD): The WFF TD has authority over all operations conducted on the WFF Test Range. The TD is responsible for assuring that all range policy, criteria, and external agreements are satisfied during the operations. The TD is the only person with authority to resume the countdown after a "HOLD" has been declared.

Project Manager (PM): The designated WFF PM is responsible for the planning, coordinating and directing of operational support for assigned projects conducted at the WFF Test Range. The PM is the author of the Operations and Safety Directive (OSD) which is designed to accomplish Project Objectives while complying with established policy, criteria, and procedures. The PM is responsible for coordinating and directing project activities as necessary during the countdown. The PM will apprise the TD and RSO of project status details and likewise keep the project personnel properly informed of range operational status. The PM also serves as Assistant TD.

Range Operations Assistant (ROA): The ROA aids the TD in closely monitoring countdown operations and range status. The ROA is normally responsible for responding to requests for information and making announcements, such as time counts, issuing clearance for radiation, establishing periods of RF avoidance, establishing roadblocks, and performing station checks.

Range Safety Officer (RSO): The WFF RSO is responsible for assuring the WFF safety policy, criteria, and procedures are not violated during operations, and to assure that risks are understood and are within acceptable limits. The RSO has authority to stop work, or hold a launch if necessary. The RSO will keep the TD and PM apprised of safety status which could effect launch operations.

Launch Pad Supervisor (LPS): The WFF or NSROC LPS is responsible for implementing operational procedures in the launch area in accordance with the project OSD. The LPS or his designated representative must be present and shall monitor all procedures involving hazardous operations. No hazardous procedures will be initiated without the LPS's knowledge and consent.

Operations Safety Supervisor (OSS): The WFF OSS has authority over all hazardous operations performed during preparation and launch activities. The OSS or a designated OSS representative must be present and shall monitor all procedures involving hazardous operations. No hazardous procedures will be initiated without his knowledge and consent.

Mission Manager (MM): The MM is responsible for assuring that programmatic objectives are achieved. He has authority, with the Test Director's concurrence, to conduct tests of program systems in accordance with procedures approved by NASA. He will keep the PM appraised of program status.

9200 Abbreviations used in countdown under "ACT BY":

ACS …….	Attitude Control System
CAM5 ….....…….	Camera 5
CAM15 ….....…….	Camera 15
COMP ….....……	Computer
FOTO ….....……	Photographer
LC ……	Launch Control
LPS ….....……	Launch Pad Supervisor
MM ……..	Mission Manager
PGMR….....……..	Programmer
PLC ……...……..	Payload Control
PI …….	Principal Investigator
PM ……..	Project Manager
RC….....……	Radar Controller
RCC ….....…….	Range Control Center
RSO….....……..	Range Safety Officer
RD ……...	Recovery Director
TD….....……	Test Director
PTM….....……	Telemetry Engineer
TM READOUT……..	Telemetry Readout Room
TM RCVING…....…..	Telemetry Receiving Room
WO….....……	Weather Officer
WRPLC ……..	WaveRider Payload Control
WW….....……	Wind Weighting

9300 Launch Countdown

NOTE:

All items are to be announced complete on channel 1 of the WFF intercom unless preceded by "N" for no response required. Each item will be performed only after previous items have been checked complete unless directed otherwise by the Test Director or his designee. Refer to page 9001 for the list of operator title abbreviations.

All supporting elements of the operation are expected to keep the RCC advised of their status throughout the countdown. However, after the "T-5 MINUTE STATION CHECK" only personnel reporting countdown items or for elements which affect "GO/NO GO" criteria will report. The elements are designated with an "ASTERISK" in the T-5 minute station check. The countdown (program time) will be stopped remotely by the Test Director (TD), Project Manager (PM), the Range Safety Officer (RSO), or the programmer on command by the TD, if necessary.

This countdown officially begins at T-4:30 from the stated opening of the launch window stated in Section 1110 of this OSD. At the opening of the countdown, it is assumed the vehicle and payload are staged on the launcher and the Pad/Blockhouse Voltage/Amp (V/A) checks are complete.

Shaded portions of the program time column of this countdown indicate these times are practice items conducted during the horizontal and vertical payload checks.

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
04-30-00	1	WW	Í	Í	Launch corner reflector balloon and track to maximum altitude.
04-00-00	2	TD	Í	Í	Initial contact with VACAPES and NORAD.
03-30-00	3	TD	Í	Í	Establish RF avoidance for Pad 2.
	4	LPS	Í	Í	Verify that the following tasks are complete: a. Vehicle and payload completely assembled on Pad 12 ARClauncher. b. Umbilical's rigged and connected. c. Volt/Amp checks completed. d. Batteries charged. e. All safety restraints installed. f. Set Pre-Launch Danger Area road blocks. g. Initial arming of Improved Orion Upper stage and payload. h. Connect Terrier Booster firing line.

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
	5	ROA	☐	☐	All personnel be advised that the following launch will be conducted under NRW-3761 OSD countdown procedure revision 0 dated October 16, 2003 Conduct Station Checks (Acknowledge) COMP — Computer FOTO — Photographer LC — Launcher Control LPS — Pad Supervisor PGMR — Programmer PI — Principal Investigator PM — Project Manager RC — Radar Controller MM — Mission Manager TM — Telemetry ACS — NMACS Control WW — Wind Weighting RSO — Range Safety Officer TD — Test Director
	6	TD, RSO, PM	☐	☐	Test "HOLD" button.
	7	LPS/ NSROC	☐	☐	Remove ARC shelter.
	8	FOTO	☐	☐	Take Horizontal Pictures of NRW-3761.
	9	LPS	☐	☐	Verify Pad 2 clear.
	10	ROA	☐	☐	Release RF avoidance for Pad 2
03-00-00	11	MM	☐	☐	Permission to conduct Horizontal Payload checks.
	12	TD	☐	☐	Reset countdown clock to T-8. TD announce that countdown clock has been set to T-8 minutes for Horizontal payload checks.
00-08-00	13	PLC	☐	☐	HORIZONTALS 1. Switch payload systems to EXT PWR ON in the following order: 2. TM EXT PWR ON. 3. Record TM 1 measurements. Voltage _____ Volts, 28 Volts Current _____ Amps, 1.8 Amps 4. Waverider LCTM EXT PWR ON. Voltage _____Volts, 15 V Current _____ Amps, 800 mAmp 5. GPS EXT PWR ON. 6. Transponder PWR ON. 7. Record TM Bus current. Actual _____ Amps, 2.0 Amps

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
00-07-30	14	TM Readout	☐	☐	Start chart recorders
	15	TM RCVING	☐	☐	Start magnetic tapes.
00-07-00	16	PLC	☐	☐	ARM Payload CDI System (Orion Ignition, Payload Separation) Verify GSE Data. Record the following battery voltages. Actual Nom. CDI Battery #1 _____V 32V CDI Battery #2 _____V 32V Capow Pac #1 _____V 33V Capow Pac #2 _____V 33V
00-06-30	17	PLC	☐	☐	ARM Clamp Release CDI System (Terrier Separation) Verify GSE Data. Record the following battery voltages. Actual Nom. CDI Battery #1 _____V 15V CDI Battery #2 _____V 15V Capow Pac #1 _____V 33V Capow Pac #2 _____V 33V
	18	RC	☐	☐	Interrogate Pad 2 transponder and verify good signal.
	19	PTM	☐	☐	Verify data in limits on GDP's.
	20	PTM	☐	☐	Verify chart recorder channels are nominal.
	21	PTM	☐	☐	Screen print numeric displays from GDP.
00-06-00	22	TM RCVING	☐	☐	Record Transmitter parameters. Actual Nominal TM Sig Str _____dB >30 dB C/N Deviation _____kHz ± 560 kHz LCTM Sig Str _____dB >30dB C/N Deviation _____khz +/- 87.5 khz Video Sig Str _____dB >30dB C/N Deviation _____ khz +/- 4 mhz WR Video Sig Str _____dB >30dB C/N Deviation _____ khz +/- 4 mhz WR Data Sig Str _____dB >30dB C/N Deviation _____ khz +/- ??? khz
	23	ACS	☐	☐	Switch ACS system to EXT PWR ON

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
00-03-00	24	PLC	Í	Í	Switch TM, Waverider LCTM, GPS, to Internal Power and record battery voltages below: Actual Nominal TM Battery _____V 30 V Pyro Battery _____V 20 V Waverider LCTM _____V 15 V
	25	ACS	Í	Í	Switch ACS system to Internal Power
00-02-30	26	TM RCVING	Í	Í	Verify no change in signal strength or deviation.
	27	RC	Í	Í	Verify Good Radar Transponder.
00-02-00	28	PTM	Í	Í	Verify data in limits on GDP.
00-00-00	29	PLC	Í	Í	SAFE Clamp Release and P/L CDI systems.
	30	PLC	Í	Í	Switch GPS, Waverider LCTM, and TM to External Power.
	31	ACS	Í	Í	Switch ACS to External Power
	32	PLC	Í	Í	Switch Transponder, GPS, Waverider LCTM, and TM OFF.
	33	ACS	Í	Í	Switch ACS OFF
	34	TM RCVING	Í	Í	Stop mag tapes.
	35	TM Readout	Í	Í	Stop chart recorders.
	36	MM	Í	Í	Verify Horizontal Payload checks complete.
	37	TD	Í	Í	Reset countdown clock to project T-minus time.
02-30-00	38	WW	Í	Í	Release and track corner reflector balloon to 50 kft. Altitude.
	39	ROA	Í	Í	Establish RF Avoidance on Pad 2.
	40	LPS/ NSROC	Í	Í	Commence final Vehicle/Payload systems arming. (Orion Ignition/Payload Separation)
02-00-00	41	TD	Í	Í	Initial contact with FAA.
	42	TD	Í	Í	Release surveillance aircraft for Take-Off.
	43	COMP	Í	Í	Conduct simulation using nominal trajectory.
	44	LPS/ NSROC			Commence final Vehicle systems arming. (Terrier Clamp Release)
	45	LPS/ NSROC	Í	Í	ARM TERRIER.
	46	LPS/ NSROC			Remove all safety restraints.
01-30-00	47	ROA	Í	Í	Verify Pad 2 clear.
	48	ACS	Í	Í	Pressurize ACS system to Flight Pressure
	49	ROA	Í	Í	Release RF Avoidance on Pad 2.
	50	LPS	Í	Í	Elevate launcher to nominal settings: AZ = 107° EL = 82°
	51	PLC	Í	Í	Verify all Payload and Vehicle Safeties removed and "Safety Check List" complete.
01-15-00	52	MM	Í	Í	Permission to conduct Vertical Payload checks.

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
	53	TD	☐	☐	Reset countdown clock to T-8. TD announce that countdown clock has been set to T-8 minutes for Vertical Payload checks.
	54	WW	☐	☐	Commence 15 minute interval wind-weight chaff balloon release schedule. Track to an altitude of 6000 feet.
	55	ACFT	☐	☐	Surveillance Aircraft. On station with first ship report.
00-08-00	56	PLC	☐	☐	VERTICALS 1. Switch payload systems to EXT PWR ON in the following order: 2. TM EXT PWR ON. 3. Record TM 1 measurements. Voltage _____ Volts, 28 Volts Current _____ Amps, 1.8 Amps 4. Waverider LCTM EXT PWR ON. Voltage _____ Volts, 15 V Current _____ Amps, 800 mAmp 5. GPS EXT PWR ON. 6. Transponder PWR ON. 7. Record TM Bus current. Actual _____ Amps, 2.0 Amps
00-07-30	57	TM Readout	☐	☐	Start chart recorders
	58	TM RCVING	☐	☐	Start magnetic tapes.
00-07-00	59	PLC	☐	☐	ARM Payload CDI System (Orion Ignition, Payload Separation) Verify GSE Data. Record the following battery voltages. Actual Nom. CDI Battery #1 _____V 32V CDI Battery #2 _____V 32V Capow Pac #1 _____V 33V Capow Pac #2 _____V 33V
00-06-30	60	PLC	☐	☐	ARM Clamp Release CDI System (Terrier Separation) Verify GSE Data. Record the following battery voltages. Actual Nom. CDI Battery #1 _____V 15V CDI Battery #2 _____V 15V Capow Pac #1 _____V 33V Capow Pac #2 _____V 33V
	61	RC	☐	☐	Interrogate Pad 2 transponder and verify good signal.
	62	PTM	☐	☐	Verify data in limits on GDP's.
	63	PTM	☐	☐	Verify chart recorder channels are nominal.

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
	64	PTM	Í	Í	Screen print numeric displays from GDP.
00-06-00	65	TM RCVING	Í	Í	Record Transmitter parameters. Actual Nominal TM Sig Str _____dB >30 dB C/N Deviation _____kHz ± 560 kHz LCTM Sig Str _____dB >30dB C/N Deviation _____khz +/- 87.5 khz Video Sig Str _____dB >30dB C/N Deviation _____ khz +/- 4 mhz WR Video Sig Str _____dB >30dB C/N Deviation _____ khz +/- 4 mhz WR Data Sig Str _____dB >30dB C/N Deviation _____ khz +/- ??? khz
	66	ACS	Í	Í	Switch ACS system to EXT PWR ON
00-03-00	67	PLC	Í	Í	Switch TM, Waverider LCTM, GPS, to Internal Power and record battery voltages below: Actual Nominal TM Battery _____V 30 V Pyro Battery _____V 20 V Waverider LCTM _____V 15 V
	68	ACS	Í	Í	Switch ACS system to Internal Power
00-02-30	69	TM RCVING	Í	Í	Verify no change in signal strength or deviation.
	70	RC	Í	Í	Verify Good Radar Transponder.
00-02-00	71	PTM	Í	Í	Verify data in limits on GDP.
00-00-00	72	PLC	Í	Í	SAFE Clamp and P/L CDI systems.
	73	PLC	Í	Í	Switch Waverider LCTM, GPS, and TM, to External Power.
	74	ACS	Í	Í	Switch ACS to External Power
	75	PLCT	Í	Í	Switch Transponder, Waverider LCTM, and TM OFF. (GPS to remain ON)
	76	ACS	Í	Í	Switch ACS OFF
	77	TM RCVING	Í	Í	Stop mag tapes.
	78	TM Readout	Í	Í	Stop chart recorders.
	79	MM	Í	Í	Verify Vertical Payload checks complete.
	80	TD	Í	Í	Reset countdown clock to project T-minus time.
01-00-00	81	PM/TD	Í	Í	Check weather synopsis
	82	ROA	Í	Í	Establish RF Avoidance on Pad 2.
	83	FOTO	Í	Í	Take Vertical Pictures of NRW-3761

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
	84	COMP	Í	Í	Conduct simulation using nominal trajectory.
	85	FOTO5	Í	Í	Align Pad 2 cameras.
	86	ROA	Í	Í	Verify Pad 2 clear.
00-50-00	87	LPS	Í	Í	Clear launch danger area and set Launch Roadblocks.
00-30-00	88	TD	Í	Í	Status check with FAA and VaCapes Clearance.
	89	WW	Í	Í	Provide initial wind weighting launcher settings
	90		Í	Í	
	91	MM	Í	Í	Request status impact area clearance.
00-15-00	92	ROA	Í	Í	Confirm Pad 2 clear.
	93		Í	Í	
00-10-00	94	PGMR	Í	Í	Time Count.
	95	TD	Í	Í	Confirm final launcher settings SET EFFECTIVE _____□ EL _____□ EL _____□AZ _____□AZ
	96	TD	Í	Í	Verify Surveillance Aircraft are clear of danger areas.
00-08-00	97	PLC	Í	Í	1 Switch payload systems to EXT PWR ON in the following order: 2 TM EXT PWR ON. 3 Record TM 1 measurements. Voltage _____ Volts, 28 Volts Current _____ Amps, 1.8 Amps 4 Waverider LCTM Exp Pwr ON Voltage _____ Volts 15 Volts Current _____Amps 800 mAmp 5 Transponder PWR ON. 6 Record TM Bus current. Actual _____ Amps, 2.0 Amps
00-07-30	98	TM READOUT	Í	Í	Start chart recorders.
	99	TM RCVING	Í	Í	Start magnetic tapes.
00-07-00	100	PLC	Í	Í	ARM Payload CDI System, Verify GSE Data. Record the following battery voltages. Actual Nom. CDI Battery #1 _____V 32V CDI Battery #2 _____V 32V Capow Pac _____V 33V Capow Pac _____V 33V

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
00-06-30	101	PLC	Í	Í	ARM Clamp CDI System, Verify GSE Data. Record the following battery voltages. Actual Nom. CDI Battery #1 _____V 15V CDI Battery #2 _____V 15V Capow Pac _____V 33V Capow Pac _____V 33V
	102	RC	Í	Í	Interrogate Pad 2 transponder and verify good signal.
	103	PTM	Í	Í	Verify data in limits on GDP's.
	104	PTM	Í	Í	Verify chart recorder channels are nominal.
	105	PTM	Í	Í	Screen print numeric displays from GDP
00-06-00	106	ACS	Í	Í	Switch ACS to EXT PWR ON
	107	TM RCVING	Í	Í	Record Transmitter parameters. Actual Nominal TM Sig Str _____dB >30 dB C/N Deviation _____kHz ± 560 kHz LCTM Sig Str _____dB >30dB C/N Deviation _____khz +/- 87.5 khz Video Sig Str _____dB >30dB C/N Deviation _____ khz +/- 4 mhz WR Video Sig Str _____dB >30dB C/N Deviation _____ khz +/- 4 mhz WR Data Sig Str _____dB >30dB C/N Deviation _____ khz +/- ??? khz

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
00-05-00	108	ROA	Í	Í	Announce "This is NRW-3761 Mk70 Terrier-Improved Orion launching from Pad 2 ARC launcher. Please stand by for station checks. All stations should announce status as 'Green' or 'Red' on Channel 1." Camera Station 5 ____GO Camera Station 15 ____GO * Test Director: R-6604 ____GO VACAPES ____GO FAA Airspace ____GO USCG NOTMAR ____GO * Computer RTCS or RTBS ____GO * Launch Pad Supervisor ____ GO * Launcher Control Programmer ____ GO * Principal Investigator ____GO * Mission Manager ____GO * Payload Telemetry ____GO * Payload Control ____GO Photographer Lift off/tracking camera's ____GO * Project Manager ____GO * Radar Controller C-Band radars ____GO * Range Safety Officer: ____ GO Launch Hazard Area ____GO Air/Surface hazard area within limits ____GO Flight Safety criteria/requirements satisfied ____ GO * Telemetry Tracking Antenna's ____GO * Sounding Rocket Office _____GO * NMACS Control ____GO Wind Weighting____GO
	109	TD	Í	Í	Test Director final briefing on "Hold" procedures. Announce "All stations are responsible for reviewing the GO / NO GO criteria listed in the OSD. Only stations annotated with an asterisk are permitted to call a HOLD. All other sites should report RED.
	110	ROA	Í	Í	Confirm final launcher settings SET EFFECTIVE _____□ EL _____□ EL _____□AZ _____□AZ
00-04-00	111	PGMR	Í	Í	Time Count

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
00-03-00	112	PGMR	Í	Í	Time Count
00-03-00	113	PLC	Í	Í	Switch TM, Wavrider LCTM and GPS to Internal Power and record battery voltages below: Actual Nominal TM Battery _____V 30 V Pyro Battery _____V 20 V Waverider LCTM _____V 15 V
	114	ACS	Í	Í	Switch ACS system to Internal Power
00-02-30	115	TM RCVING	Í	Í	Verify no change in signal strength or deviation.
	116	RC	Í	Í	Verify Radar Transponder
	117	PLC	Í	Í	CONFIRM Vehicle CDI systems ARMED
	118	PLC	Í	Í	CONFIRM Payload CDI systems ARMED
00-02-00	119	PGMR	Í	Í	Time Count
	120	PTM	Í	Í	Verify data in limits on GDP.
	121	PTM	Í	Í	Verify chart recorder channels are nominal.
00-01-30	122	ACS	Í	Í	ACS FAST VENT
00-01-00	123	PGMR	Í	Í	Time Count.
	124	LPS	Í	Í	ARM Terrier Ignition Circuit
00-00-50	125	PGMR	Í	Í	Time Count.
00-00-40	126	PGMR	Í	Í	Time Count.
00-00-30	127	PGMR	Í	Í	Time Count.
00-00-20	128	PGMR	Í	Í	Time Count
	129	MM	Í	Í	Announce Payload Status: GO or NO-GO
00-00-10	130	PGMR	Í	Í	Time Count at one-second intervals to T-0. On T+ time, count ten second intervals to 1 minute
00-00-00	131	"N"	Í	Í	Booster ignites (vehicle and payload umbilicals disengage). Ignition Time is: _____-_____-_____Z HR MIN SEC NOTE: All personnel must remain clear of the Launch Danger Area until the "ALL CLEAR" Announcement is made by the TD
00-00-00.5	132	"N"	Í	Í	Rail Exit
00-00-06.2	133	"N"	Í	Í	Terrier burnout
00-00-10.0	134	"N"	Í	Í	Clamp Release
00-00-22.0	135	"N"	Í	Í	Orion Ignition
00-00-47.4	136	"N"	Í	Í	Orion Burnout
00-01-10.0	137	PTM	Í	Í	Yo-Yo Despin to 4 RPS
00-01-13.0	138	PTM	Í	Í	Payload Separation
00-01-16.5	139	PTM	Í	Í	NMACS Enable and Control to 4 RPS
00-01-22.5	140	PTM	Í	Í	NMACS Align to Mag Field

"T" MINUS HH-MM-SS	ITEM #	ACT BY	CHECK D	CHECK C	OPERATION
00-01-28.0	141	"N"	Í	Í	100 km Upleg
00-01-48.5	142	PTM	Í	Í	NMACS Outer Deadband to +/-10 degrees
00-03-02.0	143	PTM	Í	Í	NMACS Despin to .2 RPS
00-03-20.0	144	PTM	Í	Í	Switch to Forward Looking Camera
00-03-22.0	145	PTM	Í	Í	Eject Nosecone
00-03-26.7	146	"N"	Í	Í	Apogee
00-03-28.1	147	"N"	Í	Í	Eject Waverider
00-03-32.0	148	PTM	Í	Í	NMACS Spin Up to 1 RPS
00-03-38.0	149	PTM	Í	Í	NMACS Align to Mag Field
00-03-59.0	150	PTM	Í	Í	NMACS Outer Deadband to +/-10 degrees
00-04-44.0	151	PTM	Í	Í	NMACS Spin Up to 2 RPS w/ Lateral Control
00-05-30.0	152	PTM	Í	Í	NMACS Vents Tanks
00-05-25.3	153	"N"	Í	Í	100 km Downleg
00-07-22.5	154	"N"	Í	Í	Ballistic Impact